

INEEL REPORTER

A closer look at environmental management at the INEEL

July/August
1999

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Historic shipment carries waste out of Idaho

The first shipment of stored nuclear waste from the Idaho National Engineering and Environmental Laboratory to New Mexico's Waste Isolation Pilot Plant left Idaho on April 27.

It's not every day that a loaded tractor-trailer draws cheers, tears of happiness and sighs of relief. Especially at 6:30 a.m. in the middle of the desert.

But then, it's not every day that the first shipment of nuclear waste headed to the Waste Isolation Pilot Plant (WIPP) is attached to a tractor-trailer, poised to leave Idaho forever.

That fact drew a crowd of INEEL employees, state and local government officials and other spectators to cheer the historic shipment of INEEL stored transuranic waste to WIPP April 27.

Forty-two barrels of transuranic waste, sealed inside three TRUPACT II shipping casks, left the Radioactive Waste Management Complex around 6:45 a.m. and vanished into a sunrise down the road on its way to the New Mexico permanent storage site.



"As you can see, a new day is dawning in Idaho, a day we see nuclear waste leaving Idaho," Gov. Dirk Kempthorne told the crowd of about 150.

As the shipment crossed the border into Utah around 9:45 that morning, the April 30 shipment milestone in the agreement was met, with a couple days to spare. The waste safely arrived at WIPP at 7:25 p.m. the next day.


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WIPP is the world's first permanent geologic disposal site for transuranic waste. This waste is stored 2,150 feet below the surface inside rock salt deposits that are more than 225 million years old, ensuring safe storage for many thousands of years.

The April 27 shipment was the first of around 5,800 shipments of above-ground transuranic waste stored at the INEEL destined for WIPP during the next 20 years.

Further shipments could begin this summer and increase in frequency after WIPP receives its permit to house mixed transuranic waste, which is most of what the INEEL stores. The first shipment was non-mixed. 



More Information

For more information about WIPP, visit their website at <http://www.wipp.carlsbad.nm.us/>



Bioremediation of Groundwater Plume Shows Promise

Bioremediation of trichloroethene (TCE), one of five alternative treatments identified for a groundwater contaminant plume at Test Area North, is showing promising results just four months into a one-year test.

At Test Area North, where TCE-contaminated sludge was formerly injected below ground, environmental engineers are using the same well to pump 300 gallons of sodium lactate per week into the TCE-contaminated groundwater plume. Sodium lactate, a common food-grade preservative, helps naturally



TCE, an organic degreaser that was widely used in the past, is the most common groundwater contaminant in the United States.

occurring bacteria in the groundwater beneath the INEEL break down the TCE into harmless constituents. The bacteria are known as chloro-respirators, in effect “breathing” chlorine compounds to get energy for life processes.

Scientists believe the bacterial processes will break down the TCE all the way into the harmless constituents

ethene and ethane. Bacteria ferment the sodium lactate into propionate and acetate, which can be further degraded, donating electrons which provide energy to the bacteria. The ultimate breakdown products are bicarbonate, carbon dioxide, and water.

Sampling of the plume has shown TCE reduction in one case from 3800 micrograms per liter down to less than 10 micrograms per liter. The TCE first is reduced to one or more phases of dichloroethene (DCE), then further reduced to vinyl chloride.

Vinyl chloride is the last step before the harmless byproducts of ethene and ethane are produced. Continued monitoring of the contamination plume from sampling wells around the disposal well, has shown a decrease in TCE, an increase in DCE, and most recently, low concentrations of vinyl chloride near the injection well. Ethene concentrations that indicate the TCE has been driven down past the vinyl chloride stage, have also been documented.

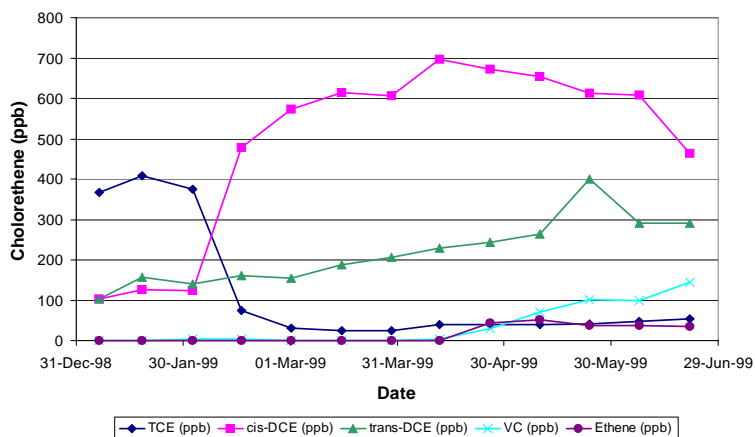
The test will last for the remainder of the year. Researchers hope two further goals can be achieved. One is to get all the TCE reduced into harmless constituents. The second is to show that reductive dechlorination can be used to attack the whole contamination source (that is, the remaining subsurface sludge), not just the TCE plume in the groundwater.



The TAN bioremediation test is the largest of its kind in the

United States, and the first in the world to attempt this type of bioremediation of groundwater in a deep fractured-rock aquifer.

Well Tan-25 after Lactate addition





The INEEL Reporter is a bimonthly DOE newsletter for the public produced by the INEEL Environmental Restoration and Waste Management programs.

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Calcliner Operations Continue

The state of Idaho extended the operating permit for the calciner at the Idaho Nuclear Technology and Engineering Center, opening the door for the continued treatment of high-level waste to put it into a more stable form.

The INEEL received good news in April when the state of Idaho Division of Environmental Quality notified DOE-Idaho and LMITCO that calciner operations could continue at the Idaho Nuclear Technology and Engineering Center. That means the INEEL will continue to solidify liquid radioactive waste.

Previously, the state DEQ had insisted the New Waste Calcining Facility cease operations by April 30, 1999 due to waste and off-gas characterizations that the DEQ felt were inadequate. Traditional sampling methods proved unreliable in previous attempts to sample the off-gas stream. The nitrous oxides in the calciner off-gas oxidized the resins used to capture organics in the emission stream for analysis.

However, using modified techniques developed over the past year by INEEL personnel in conjunction with a national technical focus seminar hosted at the INEEL, workers were able to effectively sample the off-gas stream from the calciner. First, in a laboratory test using the calcine pilot plant at INTEC, previous sampling conditions and results were duplicated, to be certain what did not work, and why. Then several modified sampling techniques were tried, to find the one that worked best.

While this was going on, a special team was at work putting sampling ports in place in the off-gas line. Strict attention was paid to worker safety during the construction and sampling efforts. A tent was constructed around the sampling port to eliminate any chance of contamination spreading if something went wrong. Nothing did.

Three series of samples were taken which will allow laboratories to detect the presence of, and determine the level of, more than 200 analytes in the off-gas stream. The first series was taken both dilute and non-dilute. When the non-dilute sampling proved effective, the remaining two series were taken non-dilute also. Science Applications International Corporation (SAIC) provided the equipment and did the sampling, which provided an independent expert involvement with objective focus.

During the sampling period, the team kept in continuous contact with calciner operators, to learn every operational detail that might affect the sampling process or results.

During the current campaign, the New Waste Calcination Facility has processed more than 100,000 gallons of liquid radioactive waste into granulated solid form, which is safer and easier to store.



For instance, changing feed blends, unplugging a line, changing scrub solutions, and internal furnace conditions such as temperature, number of feed nozzles used, and feed rate, could all affect the makeup of the off-gas stream.

The team did a job so thorough that a material balance around the entire calciner system is going to be performed using the data that was gathered. It will be the most comprehensive look at the internal chemistry of the New Waste Calciner process ever made.

Based on preliminary results of the sampling, the state DEQ knew enough to give the calciner the green light to continue operations.

Early data returns were consistent with, or even better than, assumptions about the off-gas content that were used in an earlier screening level risk assessment.

The latest change to the consent order allows the calciner to continue operations until June 1, 2000, based on continuing sampling and further research to determine the optimum operating parameters. That is the date by which DOE must decide whether or not to continue to operate the calciner long term. ▼



The latest change to the Consent Order allows the calciner to continue operations until June 1, 2000.



Waste Generator Services Managing Waste Across the Site

Lockheed Martin Idaho has responded to repeated environmental findings and Notices of Violation with a service organization dedicated to managing waste across the INEEL.

Waste Generator Services, an innovative response to repeated environmental findings and Notices of Violation, was fully deployed across the site in March. First put in place at the Idaho Nuclear Technology and Engineering Center, it was soon integrated into daily operations at the Test Reactor Area, Test Area North, Radioactive Waste Management Complex, and Waste Reduction Operations Complex-Power Burst Facility.

At INEEL facilities scattered across the desert, the storage, handling and disposal of hazardous waste, industrial waste, low level waste, and mixed low-level waste streams have taken on a uniformity and efficiency that was sometimes lacking in the past.

Not only that, but the tracking, reporting, and record keeping processes associated with various waste streams have gained consistency as a single organization takes responsibility for wastes originating in multiple facilities and processes.

WGS has also put in place the Integrated Waste Tracking System, a comprehensive database which tracks the waste and provides quick, accurate information regarding processing and shipment of waste across the INEEL. The Integrated Waste Tracking System uses bar codes and radio links to give waste handlers in the field rapid access to the information in the database.

More Information

For more information about the environmental management at the INEEL, visit their webpage at:



Waste Experimental Reduction Facility Reaches 100th Campaign

The Waste Experimental Reduction Facility completed its 100th incineration campaign for waste treatment in April. During this campaign, WERF incinerated INEEL mixed low-level waste as part of the DOE complex-wide mixed low-level waste reduction efforts.

Through an agreement with the state of Idaho (the INEEL Site Treatment Plan) off-site mixed low-level waste can be sent to the Waste Experimental Reduction Facility for treatment. Any waste that is added to the INEEL Site Treatment Plan must go through a public review and comment period. The agreement also mandates treatment of the waste within six months of receipt, and that all residual materials be removed from Idaho within six months of treatment.

Incineration at WERF started in 1984. Since that time, the facility has incinerated over 100,000 cubic meters of low-level waste from on-site, over 300 cubic meters of mixed low-level waste from on-site, and over 150 cubic meters of waste from off-site.



The 100th campaign marks a commitment by the INEEL to provide compliant mixed low-level waste treatment services for facilities throughout the DOE complex.

In February 1991, operations at WERF were suspended to improve administration and procedures, and to make modifications to the control systems. The incinerator restarted in 1995.

In 1995, the INEEL Site Treatment Plan was approved by the state of Idaho, refocusing the primary

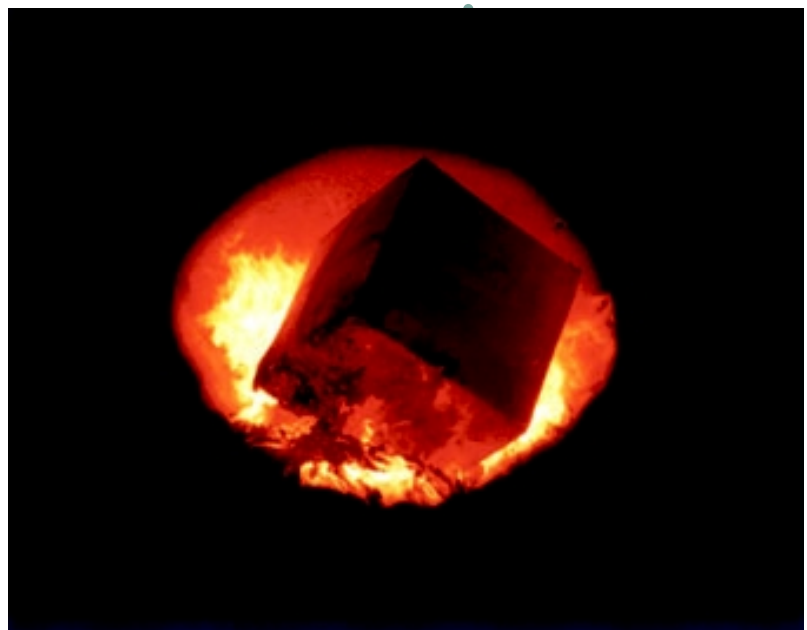
mission from on-site waste treatment, to eliminating the incinerable mixed low-level waste backlog for the DOE complex. Currently, WERF is the only incinerator in the DOE complex treating solid mixed low-level waste from other sites in the complex.

The 100th campaign marks a commitment by the INEEL to provide compliant mixed low-level waste treatment services for facilities throughout the DOE complex. The duration of a burn campaign varies, but on average a campaign lasts about two weeks, and normally treats waste originating from one DOE laboratory at a time.



Waste Experimental Reduction Facility Mission:

Assist in eliminating the backlog of mixed low-level waste from across the nation.



Central Facilities Area Proposed Plan

The proposed plan for soil cleanup at the Central Facilities Area will be issued late this month.
Public meetings will be held in August.

Schedule for Public Meetings

Public meetings for the Central Facilities Area proposed plan will start with an informal discussion with agency and project representatives from 6-7 p.m. The formal presentation will begin at 7 p.m. with an opportunity for public comments following the presentation.

Aug. 17 Shilo Inn, Idaho Falls

Aug. 18 Doubletree Downtown, Boise

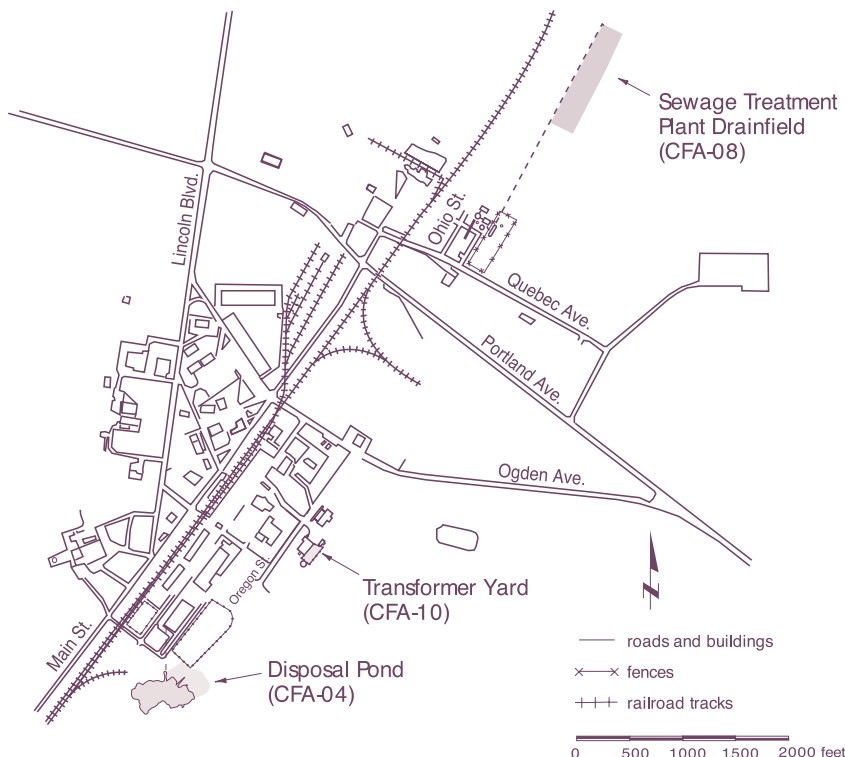
Aug. 19 University Inn Best Western, Moscow

The proposed plan for the Central Facilities Area identifies three sites for cleanup. The contaminated sites in the plan are the disposal pond (CFA-04), the sewage treatment plant drainfield (CFA-08), and the transformer yard (CFA-10). The disposal pond is a shallow basin with an area of 200 feet by 400 feet that is a maximum of 8 feet deep. It collected storm runoff from streets, parking lots, building roofs, and other areas at CFA, and liquid waste from operations at the Chemical Engineering Laboratory (active from approximately 1953 to 1969). The major contaminant at the site is mercury, present in the soil that lines the pond. It is also present in surface soils north of the pond, where it was blown and deposited by wind.

The sewage treatment plant drainfield is an area of 200 feet by 1,000 feet that collected discharge from a sewage treatment facility. In addition to ordinary sewage, the plant received wastewater from a laundry that washed radioactively contaminated protective clothing. The major contaminant at the drainfield is cesium-137, a radionuclide with a half-life of 30 years.

The transformer yard is a 65-foot by 140-foot fenced yard adjacent to a metalworking shop. The major contaminants at the yard is lead. These metals contaminate the top 6 inches of the soil.

Also at CFA, the scoping phase has begun in efforts to deal with groundwater contamination beneath the facility. Data collected during the past two years indicate that the nitrate concentrations in groundwater beneath CFA exceed the drinking water standard of 10 milligrams/liter.



Multi-Year Sampling Project Begins this Summer at RWMC

A subsurface water sampling project at the Radioactive Waste Management Complex will help scientists determine the methods by which man-made radioactive particles are transported through the soil beneath the Subsurface Disposal Area at RWMC, and the potential effects of such particle movement on the Snake River Plain Aquifer far below.

The Subsurface Disposal Area Colloidal Sampling Project is under way at the Radioactive Waste Management Complex this summer. The multi-year laboratory study of colloidal transport mechanisms is conducted primarily at Clemson University in South Carolina, but the current sampling program will tie the university study to actual field conditions at the Subsurface Disposal Area at the Radioactive Waste Management Complex. Results from the program will help answer questions about actinide movement and potential effects on the aquifer.



In July, the INEEL will collect 22 water samples near the Subsurface Disposal Area from both the aquifer and the vadose zone, the relatively dry region between land surface and the water table. The Subsurface Disposal Area is the landfill at the Radioactive Waste Management Complex that has been used for burial of defense-related waste since the 50s.

Colloids are small particles in aqueous suspension. They can move readily through groundwater because they do not tend to attach to substances naturally occurring in the soil. Scientists hypothesize that colloids may facilitate the migration of some actinides. Actinides, such as some isotopes uranium and plutonium, are radioactive elements that are generally produced by human activities. Actinides are among the contaminants which have been buried at the Subsurface Disposal Area in the past. Occasionally actinides have been detected in the vadose zone at depths of more than 100 feet beneath the Subsurface Disposal Area.

The 22 samples will be analyzed at Los Alamos National Laboratory for colloidal characterization and for actinide isotopes. The Los Alamos National Laboratory isotopic analysis can detect smaller concentrations than methods currently available in commercial laboratories. These analyses can also distinguish between man-made and natural isotopes of uranium at very low concentrations.

The project is a joint effort among the INEEL, Los Alamos National Laboratory, and the Pacific National Laboratory.

Actinides:

A series of elements in the periodic table, generally considered to range in atomic number from 90 to 103.



Briefly

► In May, Secretary of Energy Bill Richardson named **Beverly A. Cook as the Manager of the Idaho Operations Office. She assumed full responsibilities in her new position June 1.** Cook had been Principal Deputy Director of the Office of Nuclear Energy, Science and Technology since June 1998. Before assuming her current position, Cook was responsible for the disposition of the Office of Nuclear Energy's legacy materials and the safe shutdown of excess reactors and other excess nuclear facilities. From 1991 to 1998, Cook held various positions in Nuclear Energy, including Program Director for Space Nuclear Programs, responsible for the fabrication, quality assurance and nuclear safety of the radioisotope thermoelectric generators that were provided to the National Aeronautics and Space Administration for spacecraft power for the Cassini mission to Saturn, launched in October 1997. She also represented NASA and DOE in extensive communications with the public and press on issues related to the safe use of nuclear systems for spacecraft power.

► **Bechtel B&W Idaho, LLC (BBWI) was selected in June to manage the Idaho National Engineering and Environmental Laboratory by the Department of Energy.** Bechtel is one of the nation's leading engineering firms, with proven experience in managing and cleaning up DOE sites. Other members of the BBWI team are BWX Technologies and the Inland Northwest Research Alliance. BWX Technologies is a leader in nuclear operations, safeguards and security, and special nuclear material handling. INRA is an alliance of seven regional universities that perform research and development for DOE, Department of Defense, NASA and other customers. BBWI will replace Lockheed Martin Idaho Technologies Co., the current management and operating contractor at the INEEL, on September 30, 1999. Transition began July 1.

► **The Idaho National Engineering and Environmental Laboratory Citizens Advisory Board is currently recruiting potential new board members.** The Citizens Advisory Board considers issues of importance to operations at the INEEL and develops consensus recommendations to the Department of Energy and the agencies that oversee INEEL operations. Interested individuals can call Jason Associates Corporation, (208) 522-1662 for more information.

► **A fact sheet discussing the Waste Area Group 10 comprehensive investigation will be available in July. The investigation will examine the INEEL's effects on the Snake River Plain Aquifer and the effects on the ecology of the INEEL.** Waste Area Group 10 is those contaminated and potentially contaminated sites, not evaluated by other Waste area groups, and the entire Snake River Plain aquifer, not evaluated by other WAGs.

► **The 1999 Environmental Management Progress supplement to the INEEL Reporter is now available.** This document highlights the accomplishments of waste management and environmental restoration projects at the INEEL during the past year and briefly previews upcoming activities. To request copies of the document or to schedule a briefing contact the INEEL Community Relations office at (208) 526-0075 or our toll-free number 800-706-2680, or visit our webpage at www.environment.inel.gov.

Get Involved

Citizens are encouraged to get involved in decision-making at the INEEL by reviewing and commenting on documents, attending public meetings, and requesting briefings or tours. Information about these public involvement activities can be obtained through:

Target Mailing Lists

Mailing lists are continually updated so interested citizens and groups can automatically receive general or specific INEEL information (electronically or through U.S. Mail). You can be added to mailing lists by calling the INEEL toll-free number.



Toll-Free Phone Number

To obtain specific documents or other information, request a speaker or briefing on a particular topic, inquire about public meetings or public comment periods, or schedule a tour of INEEL, call the INEEL toll-free number at 1 (800) 708-2680.



Videos/Instructional Materials

Videos and brochures are available on a variety of subjects including the Snake River Plain Aquifer, waste management, and general INEEL history. To request these items, call the INEEL toll-free number.



Internet

The INEEL Home Page is available at <http://www.inel.gov>. Specific INEEL environmental information is available at <http://www.environment.inel.gov>. The INEEL Administrative Record is available at <http://ar.inel.gov/home.html>.



Information Repositories

DOE maintains three information repositories throughout Idaho. The Boise State University repository will be available in October. Information repositories are collections of documents that provide detail and backup information on INEEL cleanup projects.



INEEL Technical Library
DOE Public Reading Room
1776 Science Center Drive
Idaho Falls, ID 83415

Albertson Library
Boise State University
1910 University Drive
Boise, ID 83725

University of Idaho Library
University of Idaho Campus
434 2nd Street
Moscow, ID 83843

INEEL Idaho Falls Office

The INEEL Community Relations Office is located in Idaho Falls and can provide information and briefings on environmental management topics. Call the INEEL Community Relations Plan Coordinator, Erik Simpson, at (208) 526-4700, or call the INEEL toll-free number.



INEEL Boise Regional Office

An INEEL Regional Office is located in Boise to provide information and other resources for those living in the western portion of the state. The office is located at 805 West Idaho Street, Suite 301, Boise, Idaho 83703, or call 208-334-9572.





Calendar

August

- ▶ 17 Central Facilities Area proposed plan meeting, 7:00 p.m., Shilo Inn, Idaho Falls
- ▶ 18 Central Facilities Area proposed plan meeting, 7:00 p.m., Doubletree Downtowner.
Boise
- ▶ 19 Central Facilities Area proposed plan meeting, 7:00 p.m., University Inn Best Western,
Moscow



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